PROVINCIA DI TORINO
BIBLIOTECA
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OCTAVIUS WATERHOUSE.

Elizabeth Waterhouse.

Charles Thurstan Holland.

Sketched by Dr Barry

Drawn on Stone by D. Volck, Heidelberg

THE GUIDE, COUTTET.

Ascending the Ice Cliff, to gain the Grand Mulet Rock.

Sketched by Dr Barry.

Drawn on Stone by D. Volck, Heidelberg

THE GUIDES, COUTTET AND BALMAT,-

Having gained the Grand Mulet Rock,- drawing up the rest of the party.

ASCENT

TO THE SUMMIT

OF

MONT BLANC,

16th—18th of 9th Month (SEPT^{R}), 1834.

BY

MARTIN BARRY, M.D.

ASCENT, &c.

(The principal part of the following Narrative appeared in the "*Edinburgh New Philosophical Journal for January*, 1835.")

As we reached the Col de Balme, on the 15th, in passing from Martigny to the Priory of Chamonix, Mont Blanc presented itself for the first time. It came suddenly and magnificently into view in its whole extent, so that the eye knew not where to begin the contemplation of the amazing picture. The Col de Balme may, on this account, be recommended as a point from which to obtain the first *near* view of the mountain. Though inferior to Chimboraço in its elevation *above the sea*, Mont Blanc is to be considered as the higher mountain of the two, as it rises 12,300 feet above the valley of Chamonix; Chimboraço not more than 11,600 above the plain of Quito. There is another important feature in Mont Blanc; its line of perpetual snow is nearly 7000 feet *below the summit*; that of Chimboraço only 2,400, according to Humboldt.

On my arrival at the Priory in the evening, guides were consulted as to the probable practicability of an ascent. It was objected, in the first place, that the season was too far advanced, and secondly, that some snow had recently fallen, which had not had time to harden: as a consequence of the first obstacle, that the days were too short, and that the fissures had probably widened; of the second, that the way would be rendered not only more difficult, but more dangerous also, from the newly fallen snow lightly covering, and thus concealing, the smaller crevices. Avalanches, too, were likely to occur more frequently with a layer of recent snow. On the other hand, the weather had never perhaps presented a more favourable opportunity; the moon was nearly full; I was in excellent "training," from having lately climbed some of the heights in Switzerland; and additional interest was given to the undertaking, from the lapse of four years since the last ascent, which, according to a list seen at the Priory, was made by my countryman, Capt. E. B. Wilbraham, in 1830.*

* I was informed that an attempt had been made this summer (1834) by two gentlemen of Savoy, but that, from bad weather, it had failed.

Taking all circumstances into consideration, I concluded to make the attempt, though it had been first seriously contemplated only a few hours before; and having procured six guides, I set out the next morning, (16th) at half-past eight o'clock. The enterprise became speedily and generally known in the village; and, in consequence, a number of persons assembled near the Hotel de l'Union, to witness our departure. The cottagers too, as we passed through the valley, gave us their best wishes; here and there an anxious face bespeaking relationship with some of the gnides.

We passed through the pine wood eastward of the Buissons glacier, reaching successively the Chalet de la Para, (the last human habitation,) Pierre Pointue, and Pierre à l'Echelle; the latter point by 12 at noon. Here we overtook some men, employed by the guides to carry thus far part of the baggage, consisting of wood, charcoal, extra clothing and blankets, with several culinary utensils, and provisions for three days. After accompanying us a short distance, they took their leave, and returned to Chamonix. Several chamois were now seen bounding fleetly over the rocks just above us. We had surprised

them in a situation from which even these animals could not easily extricate themselves; and two or three minutes elapsed before the last of them made its escape. We dined at this spot, and soon afterwards at the foot of the Aiguille du Midi, entered upon the ice, *over which, exclusively, our course now lay*, and which was 7000 feet in perpendicular altitude The soles of my shoes were here armed with steel points to prevent slipping. While engaged in introducing them, a boy, dispatched from the village of Les Pélérins to the Priory, for some spirit of wine, which I wanted for an experiment on the summit, came breathless towards us; but it was sulphuric acid! not alcohol, that he had brought.

Crossing the glacier de Buissons, and obliquely ascending, we proceeded in a south-west direction, to the Mulets, an isolated chain of rocks, on one of which we hoped to pass the night.

The difficulties usually met with in crossing the glacier, have been described by several preceding travellers, who have been up the mountain.* On this occasion, the great width of the fissures, as had been anticipated, constituted

* The following is very descriptive:—"It was the avalanche alone that we had hitherto to fear, but now new dangers arose from the

a principal one; often compelling us to retrace our steps, or to pass by ridges of uncertain solidity, on either side of which there yawned an abyss of tremendous and unknown depth.

Having found it impossible to reach the Grand Mulet at the most eligible point, we were obliged to descend toward its base; but here an almost perpendicular wall of solid ice appeared entirely to cut off the immediate approach to the rock. However, at length, two of the guides, with the greatest difficulty, gained it; and then, by means of cords, drew up the rest of the party, as well

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crevices, those deep clefts in the ice formed by the constant movement of the body towards the valley, which separates immense parts of it. The higher masses, meeting with some slight opposition, remain stationary; the lower, proceeding in their course, widen the breach; and thus throughout the whole glacier, in every direction, are formed tremendous fissures." * * * * * * "We were surrounded by ice piled up in mountains, crevices presenting themselves at every step, and masses half sunk into some deep gulph; the remainder, raised above us, seemed to put insurmountable barriers to our proceeding: yet some part was found where steps could be cut with the hatchet, and we passed over these bridges, often grasping the ice with one hand, while the other, bearing the pole, balanced the body, hanging over some abyss, into which the eye penetrated, and searched in vain for the extremity. Sometimes we were obliged to climb up from one crag of ice to another, sometimes to scramble along a ledge on our hands and knees, often descending into a deep chasm on the one side, and scaling the slippery precipice on the other."—"*Narrative of an Ascent to the Summit of Mont Blanc, on the 8th and 9th August*, 1827, *by John Auldjo, Esq. of Trinity College, Cambridge, Second Edition*,"—a volume which I recommend to those who may desire to see a more detailed account than it is my purpose to give.

as the baggage. In this perilous undertaking, the leading guide ascended the ice cliff, by a circuitous course, secured with a rope held by those below, as a false step would certainly have otherwise proved fatal; his track lying along the brink of a precipice. (See the two Plates.*) Our pioneers on this, and indeed on all occasions, where the greatest coolness, intrepidity, experience, and judgment were required, were Joseph Marie Couttet, and Michel Balmat. Of these brave men I cannot speak too highly: without them, the undertaking would undoubtedly have proved a failure, at this as well as at other difficult parts. The well-known Couttet, my principal guide, had been up *eight times* before; he was swept away by an avalanche in Dr. Hamel's attempt (1820,) with four others, three of whom were never afterwards found. No one should attempt the ascent of Mont Blanc without him. He is also a remarkably intelligent man. I was always glad to have him and Balmat near me when they were not obliged to take the lead.†

* The plates present only a small portion of the rock, near its base.

† These remarks respecting the guides may be of service to some future traveller; and having mentioned two of them, I may as well

Having at length gained the Grand Mulet rock, *but at a point much lower down than usual*, and as it appears by a memorandum which Couttet afterwards handed me, with a degree of difficulty, that he had seen equalled on no former occasion,* a dangerous climb, of perhaps two hundred feet, was required, to bring us to that part proposed as our resting place for the night; a narrow ledge, usually selected, as being out of the reach of avalanches. We reached this spot by half-past six. It consisted in a flat surface of a few square feet, forming a sort of open shelf, on the south-west side of the rock; its margin a precipice. Our bâtons, inclined against the rock,

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give the names of the rest. They were, Pierre Tairraz, who had been up three times; François Despland and Simon Tournier, each up once before; and Jean Tairraz, up for the first time. They all had their good qualities, and each of them had an opportunity of rendering me assistance in difficult and dangerous places, and performed his part in the most faithful manner. The one last named, is a courageous, enterprising, and very obliging guide, whose attentions, during our sojourn upon the rock, contributed much to my personal comfort.

* The following is a copy of part of the memorandum received from Couttet:—"Je soussigne et certifie avoir été 9 fois au sommet du Mont Blanc. Je n'ai jamais rencontré autant de difficultés que cette fois-ci (avec le Docteur Barry, que j'ai accompagné jusq'au sommet du Mont Blanc) pour arriver au Grand Mulet: et la neige nouvelle nous a beaucoup fatigué. Malgré toutes les difficultés, notre voyage a été heureux.—*Chamonix, le* 20 *Septembre*, 1834.

(Signed) COUTTET JOSEPH, Guide."

served as rafters for the roof of a little cabin, which was completed with canvass, two or three blankets having been spread on its floor. I found the height of the barometer *here*, at three-quarters past six o'clock, to be = Eng. inches 21.235; the *attached* thermometer = 45°.50 F. A fire was made at a short distance from the tent, and we supped with good appetites around it. At nine o'clock, having tripled some parts of our clothing, and provided particularly for the feet, we crept into our cabin, and soon found that, lying very closely together, we were sufficiently warm.

Awaking at twelve, I got up, and regretted to see that two of the guides, Couttet and J. Tairraz, were lying in the open air, from want of room in the tent. The cold, however, was not intense, for a thermometer, which at nine o'clock indicated 39° F. had risen to 42°, a smart breeze from the south-west having entirely subsided. At half-past one, A. M., the thermometer had again fallen to 41°.

It was a brilliant night. The full moon had risen over the summit of the mountain, and shone resplendent on the glazed surface of its snowy covering. The guides were sleeping.

Thus, in the midnight hour, at an elevation of ten thousand feet, I stood—alone: my resting-place a pinnacle of rock, that towered darkly above the frozen wilderness from which it, isolated, rose. Below me lay piled, in the wildest confusion, the colossal masses of ice we had been climbing, and whose dangers we had narrowly escaped: around and above was a sea of fair but treacherous snow, whose hidden perils we had yet to encounter. The Jura mountains, and many an unknown peak of Switzerland, seen dimly in the distance, gave me an earnest of the prospect from still more elevated regions. The vale of Chamonix was sleeping at the foot of the mountain; and, broken by the occasional thunder of an avalanche, the profoundest silence reigned. It seemed the vastest, sternest, sublimest of Nature's imagery reposing;—now starting as in a fitful dream,—then sinking again into the stillest calm. Oh, such a scene! It held me until, at the end of an hour and a half, a recollection of the coming day's fatigues, rendered it prudent again to take repose.

At five on the morning of the 17th, we left the Grand Mulet. Proceeding at first across

the icy valley, that lay between us and the Dôme du Gouttet, we reached almost the base of the latter; and then ascending more directly, often by a zig-zag course, arrived at the Grand Plateau by nine o'clock: another great stage of the journey being thus accomplished.

The newly fallen snow, from a foot to eighteen inches in depth, had rendered the way fatiguing; it had been needful for our leader to ascertain the safety of every step with the bâton, and we had proceeded in a line, united, two or three together, with cords, following carefully the same track. Latterly our way had lain over vast fields of snow, but the early part of it had presented scenery even more magnificent than that of the preceding day. Chasms of unfathomable depth,—towers of ice,—caverns and grottoes, whose crystal walls were adorned with a tapestry of inimitable beauty,—splendid "stalactites" guarding the entrance, that seemed hung with a silver fringe. Such scenes live in the memory, but cannot be adequately imparted by words. No wonder if I often turned, and turned again, not knowing how to leave them.*

* The blue-green colour of the ice, when occurring in large masses is here seen on the grandest scale; a phenomenon not less interesting than beautiful.

Very different feelings, however, soon took the place of the admiration which this scenery had excited. Difficulties occurred, that it required all the experience and intrepidity of Couttet and Balmat to overcome. At one point, indeed, it was found absolutely impossible to proceed further in the same course; and from the top of a block of ice, obstacles were discovered requiring an extensive change of route. The two exploring guides went a considerable distance in the direction of the Dôme du Gouttet, in search of a new route ; the rest of the party, knee-deep in the snow, anxiously awaiting their return: but they were foiled. Another, and yet another course was sought, but in vain. Four years having elapsed since Mont Blanc was last ascended, we knew not but that, from the shifting nature of the snow masses, changes had occurred sufficient to entirely prevent our further progress. The half French, half Italian, *patois* of the guides, scarcely understood by me when, under ordinary circumstances, they conversed among themselves, was now sufficiently intelligible, from the frequent occurrence of the exclamations of disappointment. Their faces, indeed, convinced me that the success of the

undertaking was not far from being despaired of.

One other direction was tried: a long, steep, and circuitous ascent, that afforded the last forlorn hope. Depressed as we were, how great was now the labour of the way; how slow, and painful, our zig-zag course. This effect was not without its physiological interest, however little comfort the consideration was, at that time, calculated to afford me. The weary ascent of this part being at length accomplished, a great fissure next presented itself, the passage of which was impossible; and from this point we must certainly have returned, but for a bridge of ice, discovered at a distance. We made for it,—it bore us over,—and our hopes brightened. But we had now to pass some very treacherous ice, among holes covered with recent snow, by which the dangers of the track were concealed. Repeatedly did the leading guide turn, to warn us of openings into which his staff had been suddenly plunged, communicating perhaps with cavities of great depth.

How cheering, in the midst of these dangers and toils, the voice of one of the guides, who, aware that we had reached a point, from which,

by means of the telescope, we could be discerned from the valley, turned to me with the announcement, "*On nous regarde!*" He knew that there would be observers watching our progress; and I well knew that, among the most anxious of them, there was one, a near relative of mine, whose painful suspense, during my absence, had been to me, and continued, the only consideration that marred the pleasures of the enterprize. We soon afterwards reached the Grand Plateau, and as the difficulties that now lay before us were not expected to be insurmountable, in the existing state of the weather, we sat down to breakfast at this spot, in very good spirits.

Three plains of snow crossed in the ascent, have been called Plateaus. The highest of these is the Grand Plateau. It was on the middle one, that De Saussure, with eighteen guides, passed the second night in his ascent in 1787. Speaking of it, he says it is 90 toises (=575 English feet) higher than the Peak of Teneriffe.

We left the Grand Plateau before ten o'clock. Above it are the Rochers Rouges, where the fatal avalanche occurred in Dr. Hamel's attempt in

1820. De Saussure's course lay to the west of these rocks: we went eastward of them, by the new route discovered in 1827, when my countrymen C. Fellowes and W. Hawes ascended, and by which a very dangerous part is avoided.

Great dryness of the skin was now observed, thirst became intense, and it seemed scarcely possible even to alleviate it, though we were constantly eating snow. The guides had stored their pockets with sugar and French plums, which were found refreshing. Not being disposed to give up the prospect around me, a veil that had been taken was not used; and this omission perhaps was the cause of some decutication of the face, and not a little soreness around the lips and nostrils, which occurred a few days after. Possibly this excessive desiccation of the face might be prevented, on such an expedition, by using some unctuous matter during the journey. The inconvenient glare of the snow is obviated by the use of green spectacles, which indeed were found almost indispensable.

A dipterous insect was found dead on the snow, at about 1500 feet below the summit, and a living hymenopterous one, 300 feet higher;

both having probably been carried up by the wind. Professor Bronn, of Heidelberg, has been so obliging as to examine these for me, and reports, that the first, which had lost some important parts, corresponds most nearly with the description of *Syrphus arcuatus* of Fallén and Meigen; and that if it be this, the vicinity of Mont Blanc is a new station for it, as, according to Meigen's monograph, it had previously been found in Sweden only. On the day after my return from the mountain, I saw two or three of what appeared to be the same insects alive, near the "Jardin," about 9000 feet above the sea. They were extremely vigilant, and rapid on the wing: I could not catch one. The second, which is very small, is so much injured and crushed, that Professor Bronn informs me it would not be possible to determine it, except in a very perfect collection.

Two large birds were seen at a distance, passing over the shoulder of the mountain, from Piedmont to Savoy.

Our progress after leaving the Grand Plateau, at first obstructed by the passage of some very formidable cliffs of ice, had latterly been impeded only by the depth of the soft snow; but

now we reached the foot of a declivity of 35° to 40° with the horizon, and many hundred feet in height. It was the "épaule droite" of the summit. The snow here had hardened sufficiently to prevent our advancing a single step, without holes being first cut with the hatchet; yet it had not become so hard as to render firm the footing thus obtained.* It was found frequently and suddenly slipping back; and when we had reached a considerable height in the declivity, this became exceedingly dangerous. In no part of the ascent were the cords, by which I was attached to the guides, more serviceable than here. Our progress, too, was so slow, that I suffered not a little from the cold; a keen breeze prevailing at the time. My feet indeed felt as if all but frozen, on which account the footing became doubly insecure. I did not feel disposed to indulge myself with the prospect below me, for it seemed as if the momentum, acquired by a fall to the foot of the declivity, would have sufficed to carry us over the margin of the steep glacier de la Brenva, and thus to

* Availing myself of an appropriate comparison in the narrative already quoted, as applying to the snow in another part of the mountain, it resembled a *"conglomerate of hailstones."*

precipitate us an unknown depth, on the Italian side of the mountain. This ascent brought us above the Rochers Rouges; the next, a slope of 28° to 30°, apparently not very difficult, was to take us to the summit.

But we had now reached an elevation, where I had to verify the testimony of preceding travellers, by experiencing the exhaustion, consequent on very slight exertion, in an atmosphere whose density is so exceedingly reduced: an inconvenience which had not been felt, by me at least, before arriving at this point (about 14,700 feet above the sea), and I had not observed it in any of the guides. Only a few steps could now be taken at a time; and these became both fewer and slower. Two or three deep inspirations appeared sufficient at each pause to enable me to proceed; but, on making the attempt, I found the exhaustion returned as before. I felt a degree of indifference too, which even a sight of the summit, just within reach, did not suffice to remove. Slight faintness also came on, so that I had at last to sit down for a few minutes: when, a little wine having been taken, one more effort was made, and at a quarter past two o'clock we stood on the highest summit; having

been seen to reach it, as we afterwards found, both from the valley of Chamonix, and from Mont Brévent opposite.*

After a few minutes of rest on the summit, all the exhaustion, faintness, and indifference had ceased: the mountain-top was gained,—the dangers of the descent were not for a moment considered,—and it was with a thrill of exultation, never felt before, that I addressed myself to the contemplation of the prospect around and beneath; the stupendous splendour of which, it is as impossible to conceive, as it would be vain to attempt to describe.

The range of sight, though limited by mountain chains in various directions, comprehends nearly the whole of Sardinia, the western half of Switzerland, one third of Lombardy, and an eighth of France. This immense space is really of an oval form: its longitudinal diameter extending from Mont Morran in France, on the north-west, to the neighbourhood of Genoa on the south-east; having Berne and Milan on the

* "It requires seventeen hours' march to reach it (the summit), but the difficulties which are met with, lengthen the route, retard the march, and render this calculation of the distance very uncertain: indeed, it is generally estimated at eighteen leagues." (Appendix to the *Narrative by J. Auldjo*, already quoted.)

one hand, Lyons and Grenobles on the other.* In a north-west direction lie the plains of France, in the south-east those of Lombardy and Piedmont: a mountainous tract, containing all the Pennine, and part of the Rhetian Alps, with the whole chain of the Jura, forming the space between. But there are directions in which the prospect is still more extended; for example, the mountains of Tuscany may be distinctly seen.

Among the objects on which I dwelt with the greatest satisfaction, was a host of inaccessible "aiguilles," projecting darkly through seas of snow, immediately around, and forming, as it were, the buttresses of Mont Blanc itself: their needle summits, to which we had almost with giddiness looked up, now lying, surmounted, far beneath our feet.

There were pointed out to me, proceeding from left to right, the Maritime Alps, the chain of the Jura from end to end, the Lake of Geneva, the Buet, the Diablerrets, the Ghemmi, the St.

* Of course neither of these cities is visible: they are here mentioned only from their being situated in or near the line that bounds the panorama. Even less distant objects, unless very elevated, can be, by the human eye, but indistinctly traced; and the nearer ones are necessarily much diminished when seen from such an altitude.

Gothard, the Furka, the Mittaghorn, the Matterhorn, the beautiful Mont Rosa, Mont Faucon, the chain of the Appenines, Mont Cenis, the mountains of Tuscany, and other heights. All the mountains of the Bernese Oberland, the Finster-aar-horn and the Jungfrau, together, formed but an inconsiderable portion of the mighty whole. And all this was seen under a sky, literally *without a cloud.**

The height of the mountain, according to the calculation of De Saussure, is 14,700 French, or 15,666 English feet (one French foot being = 1,06575 English). The extreme summit is a ridge nearly 200 feet in length, its direction east and west; the slope of the north side forming an angle, estimated by De Saussure (in 1787) at 40°--50°; that on the south 15°--20°. This estimate, which applied to the covering of snow, may be considered as not materially different at the present time.

I found the height of the barometer to be

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* Of the *summit* I have since had an excellent view from the mountain road, between Neuchatel and Basle; at three or four hours' ride from the former place: so distinct, indeed, as to admit of being sketched. This was at a distance of about thirty leagues in a straight line. De Saussure believed that he saw it from Dijon in France, distant fifty leagues.

= 17,052 inches Eng., suspended, and screened by the incasing wood from the sun's rays; the *attached* thermometer indicating 32° F.: a breeze blowing from the south.

De Saussure found the boiling point of water at the summit of Mont Blanc to be 68°,993 R. (= 187°,234 F.) Naturally wishing to repeat this interesting experiment, I had a fire lighted in a chauffer, provided for the purpose. With the aid of bellows, our materials, wood and charcoal, were kindled with less trouble than had been anticipated (Couttet assuring me that this had never been done before).* In a culinary utensil of water, in full ebullition, I immersed a thermometer, which I had procured at Chamonix, (my own thermometer having been broken), and carefully observed the height of the mercury when it ceased to rise. I am sorry, however, that I am prevented from here inserting the temperature indicated. The scale was found to be loose, and the graduation very

* I have since found that De Saussure had a charcoal fire made on the summit; but finding it very difficult to support it, he used it only for the purpose of melting snow for a beverage. A spirit-lamp was employed by him for the boiling of water. Of the charcoal he says, that, without the unceasing application of bellows, "*il s'étoignoit au moment même.*"

inaccurate, as since discovered on comparing it with a standard. It did not bear the maker's name.

The report of a pistol, twice fired, was found, as expected, very feeble. It may be worth noticing, in connection with the subject of sound, that when within a few hundred feet of the summit, in ascending, the snow being hard, *and its surface glazed*, and some of the guides considerably in advance, the creaking noise produced by the points of their bâtons in the snow, as it reached me, could be compared to nothing but the distant lowing of cattle.

While on the summit, Couttet fetched me specimens from the Rochers Méridionales, the highest rocks on its south side. One of these, marked (A), is a granite; two (B) are sienites, consisting of a blackish hornblende and white felspar, in intimate aggregation; the fourth (C) is hornblende, with veins of asbestos; and the fifth (D) a compound of hornblende and felspar, one of the "Rochers à bulles vitreuses" of De Saussure, who attributed to lightning the glassy vesicles presented by their surface.

In our way down I procured specimens of the Derniers Rochers (E), two little masses of

granite or protogine, projecting through the snow near the middle of the last slope, and therefore very near the summit on its north side. Fragments, doubtless the effect of lightning, lay around them on the snow. The felspar, generally whitish, forms about three-fourths of the mass; the quartz is grey, with a tinge of violet; and chlorite and talc occupy almost exclusively the place of mica. De Saussure has given a most minute description of the composition of these—the highest rocks which at that time had been examined by naturalists;—he stated also the dimensions of one of them, to enable future travellers to ascertain whether the snow continued to deepen on the summit. From what I recollect of this rock, it projects just about as much now, as it did at the time of De Saussure's visit, which was nearly half a century ago.

I intend sending specimens of all these rocks, marked as above, to Professor Jameson, for the Royal Museum of Natural History in the University of Edinburgh. They are interesting, as being the highest visible rocks in Europe.

The observations of others were verified regarding the blackish-blue colour of the sky, particularly in and near the zenith, as seen from

these lofty regions. The depth of this colour is known to depend on causes, which make it vary with latitude, the elevation of the observer, the sun's altitude, the season of the year, &c.; but the tint appeared to me to derive not a little additional depth from the simultaneous reception by the eye of rays from the snow; for, having been particularly struck with its intensity when in a valley many hundred feet below the summit, with high walls of snow around, I excluded the latter from the eye, and found *the tinge of black more or less completely to disappear*. To make this observation, I lay on my back, and closed my eyes for some moments; then opened them on the zenith, the snow being shut out from view, by a cylinder formed with both hands.* I do not find a shade in "Werner's

* Should the accuracy of this observation be corroborated by future ones, the value of the cyanometer, above the snow line, will depend on a judicious selection of stations by the observer. The darker tint acquired by portions of the sky, when viewed in connection with white objects, such as dense and brilliant cumuli, with well defined borders, affords a familiar example of the same kind of effect; but, with the far deeper blue of these lofty regions, and with mountains of snow *immediately* around, the effect is in proportion more striking.

Without entering into the question whether the blue of the sky is an objective or a subjective colour, (*Muncke* considers it *purely subjective*:—see his paper, "Ueber einige optische Gegenstände," in Schweigger's Journal, XXX, p. 81. See also Gehler's Wörterbuch,

Nomenclature," corresponding with the colour, as seen either with or without the snow; and of course it is not easy to speak from recollection on this subject; but probably an approach to the blackest tint observed, might be made by taking from "*Pansy Purple*" a little of its carmine red, and adding a very little more of raven-black. As viewed without the snow, "*China blue,*" with the addition of a very little more of Prussian blue, might perhaps represent the

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new Edition, p. 504.) it is obvious that the *additional depth of tint*, acquired in the above-mentioned way, is of a *subjective* character. The greater intensity of the impression produced by the white rays, incapacitates the eye to appreciate fully the blue: we refer to the latter the antithesis of the former, i. e. a more or less distinct trace of black.

In like manner, when the stronger impression on the eye is produced by the yellow or red of one object, the effect on the apparent colour of another, viewed in connection with the first, is such as would be communicated to it by the addition of their complementary colours, blue and green, respectively, and vice versâ; though it is only under certain circumstances that this is recognizable. An example occurs in the green tint, occasionally assumed by the sky, in autumn and winter, when clouds of a deep red occupy portions of the horizon. A similar effect is observed at times in the neighbourhood of glaciers, when the latter are illuminated by the setting sun. (*Kämtz*, in "Allgem. Encyclop." art. HIMMEL.) I may add, that when the sky of Mont Blanc was viewed with green spectacles, the discs of the latter became surrounded with a broad and brilliant zone, approaching in colour the "*Campanula Purple*" of Werner, but of a much more reddish hue. This result differs in degree only from those obtainable with coloured glass in lower regions.

colour. It did not insensibly pass into the pale whitish-blue of the horizon, but, what deserves remark, *terminated by a well defined border at some ten degrees above it.*

We had all left the summit by half-past three; several of the guides having descended sooner, a few hundred feet, to a more sheltered situation. One of them had headach, probably from some brandy he had taken. The rest individually assured me that they were perfectly well, and they all said that their breathing had neither on this, nor on any former occasion, been affected while *at rest* on the summit. Observations on the pulse of several had been made in the valley, with the intention to repeat them on the top of the mountain; but in prosecuting the other objects, it was forgotten. I may remark, that I did not find it needful to take any stronger drink, during the journey, than wine, a little better than the "vin ordinaire," or table beverage, of the country. Lemonade was found very refreshing. No inclination was felt to eat while on the summit. I have already mentioned, that unquenchable thirst was experienced.

The descent, in parts impeded by its steepness, and on this account attended with some

danger at the "épaule droite," was, upon the whole, very rapid,—the guides sometimes sliding down fields of snow, supported by their bâtons. While descending the slopes of ice above the Grand Plateau, I met with frequent and severe falls, from the new snow concealing their slippery surface; and, as I more than once slid down to near the margin of a precipice, this was not unattended with danger. But the guides appeared to be alarmed only, lest the over-hanging masses of snow should be thus set in motion; for it happened just at a part, where they were anxious to proceed as gently as possible, scarcely venturing to speak aloud, from its liability to avalanches, which were also very likely to occur at that time of the day, (it was between four and five in the afternoon,) and by which we might have had a recurrence of the fatal scene of 1820, already referred to, that took place at but a short distance from this spot.

In passing over a dangerous part we had crossed in the morning, I stept, with one foot, into a hole concealed by snow. On being drawn out, I attempted to explore the opening, and discovered, that a mere crust, a few inches thick, was all that still separated me from a cavity,

impenetrably dark, and whose depth was, therefore, unknown. It is not improbable that the extent of the cavity, in other directions, was in proportion to its depth; and that had the crust given way, my two nearest guides would have shared with me the consequences. This affords an example of the necessity of several persons being constantly attached together with cords; though even this precaution might have here proved unavailing.

We returned to the Grand Mulet by a quarter past six, i. e. in little more than one-fourth of the time it had taken to ascend from this rock to the summit. It was afterwards found that a spectator, my relative, already mentioned, descending from the Brévent, had, with the assistance of a glass, counted us, — seven in number, — into these our quarters for the night. The scene at sunset, both on this and the preceding evening, was splendid, the sun's disc appearing, as noticed by others, very much smaller than when seen from lower regions. At half-past six o'clock, the barometer was = 21.225 inches English, its attached thermometer being = 44°.37 Fahrenheit.

A fire was again made, the cabin re-con-

structed on the same ledge as the preceding evening, we supped, and retired to rest. Two of the guides again passed the night without a shelter (but without sustaining any harm). Had a storm arisen, it is probable that we should all have done the same, for a gust of wind would have blown away the bâtons and sheet, which formed our cabin.

As many of the attempted ascents of Mont Blanc have been unsuccessful from bad weather, extreme cold, or fatigue, it seems exceedingly desirable that a more substantial shelter should be provided, into which a party could retire, for even a few days, if requisite; and as additional interest would be given to Chamonix by any thing facilitating the ascent of Mont Blanc, it might be worth the consideration of the Sardinian Government, to employ some men a month or two, in hewing out a cavity in the Grand Mulet rock for this purpose.

The next morning, 18th, on this rock, the barometer, at a quarter past six, stood at 21.198 inches English, the attached thermometer being = 39°.87 F. Specimens were collected of the plants within reach. Among them were *Aretia alpina*, *Saxifraga bryoides*, *Poa laxa* and

nemoralis, with several lichens and mosses not yet determined. Specimens were also taken of a micaceous rock occurring here, containing cubes of iron pyrites; also of gneiss with asbestos. A small bird was observed on the rock, which, however, I did not see. We were gratified, just before starting, with the sight of a splendid avalanche, which occurred at a distance, as estimated by one of the guides, of "une demi-heure" (= $1\frac{1}{2}$ mile English), and in a few moments, a shower of ice particles, that resulted from it, reached us.

We left the Grand Mulet at half-past seven A. M., and retraced our steps as nearly as possible across the glacier; here and there, by a shorter passage, saving part of the distance. At the foot of the Aiguille du Midi, numerous fragments of ice, very newly fallen, covered the ground for a considerable distance, and we hastened over it in dread of more.

Having safely re-crossed the glacier, all serious danger was past. The undertaking had been particularly well-timed: it was not until De Saussure's *third* attempt, and after he had contemplated the ascent for six-and-twenty years, that he succeeded; and the indefatigable

Bourrit was obliged to return at *five* different times, and never accomplished his object.

Human forms were soon afterwards descried on the rocks below Pierre à l'Echelle ; and I had the satisfaction, truly not a small one, of recognizing among them my friend, who, accompanied by a man and boy, had ascended thus far to meet me. He, as well as other observers, had witnessed, from the Brévent, our arrival on the summit, and had seen us in different parts of the snowy track. His feelings, on first dicovering us, which was, as I had expected, a little before we reached the Grand Plateau, may be appreciated from the fact of his having, a few hours previously, observed a tremendous avalanche,* near the Grand Mulet, just at the time when we were likely to be leaving that rock. As seen with a telescope, we had appeared like black points, slowly moving along in a line, and separated by spaces corresponding with the lengths of the uniting cords.

It was very interesting to me, just before reaching the valley, to meet with Jacques Balmat, an old man of 73, who, in an attempt

* In magnitude, it had resembled a city falling : the icy edifices first dashing fearfully down the glacier from side to side ;—then buried in a cloud of particles, into which they had been shivered.

to ascend this mountain in the year 1786, having passed a night alone in a storm upon the snow, discovered a way—probably the only way—of reaching the summit, and the same year conducted Dr. Paccard to it. He was De Saussure's principal guide in 1787, and has been surnamed "Mont Blanc."

At the village of Les Pélérins, several of my countrymen congratulated me on my safe return; and as we passed through the valley, the cottage doors presented smiling countenances, that bespoke a heart-felt welcome, and feelings very different from those with which our departure had been witnessed three days before.

Between three and four o'clock in the afternoon, we arrived at the Priory, not having met with any accident, and having had three days *during which I did not see a cloud.* The barometer brought down from Mont Blanc stood at 26,918 English inches at five P.M, the attached thermometer = 71°.37 F.; hence I found that it had sustained no injury, and that the observations taken at the summit, &c. might be relied on.

In the evening the guides supped with me, my relative and the venerable Jacques Balmat "de Mont Blanc" joining us. What a repast

it was! Jacques Balmat could tell of dangers half a century gone by—of a night spent in solitude, in a storm, upon the glacier—of the exultation felt when the summit was attained for the first time, the result of his own persevering exertions,* —— Couttet, precipitated into a crevice by an avalanche in 1820; buried, and almost asphyxized, in the snow, when discovered and drawn out by a fellow-guide,†—who had fallen into the same fissure,—had now stood on the summit for the ninth time: with him and Michel Balmat, more especially, I could converse of the dangers we had together shared, for they usually took immediate charge of me, when not required to go in advance of the party. It was Balmat who had given me the wine, when fainting on the last slope. Of Jean Tairraz I could say, that it was he who drew me out of the cavity into which I was falling, and that he made the fire, by which water was boiled on the summit. (He was very anxious that I

* By a letter from Couttet, I am grieved to learn that this interesting old man is supposed to have perished on a mountain near the "Dent de Midi de Bex," whither he had gone in search of minerals.

† Julien Devouassoud, a very distinguished guide, whose affecting relation of the catastrophe is given in Dr. Clarke's narrative. I regretted that his absence from Chamonix prevented my having his services.

should notice the latter in his certificate, which was done.) Tournier had had me in charge in some critical moments: Despland had assisted me in scaling two hundred feet of the Grand Mulet: Pierre Tairraz had taken a fur covering for his feet during the night, at this rock, but wrapped it around my own. These brave Savoyards,—three days before, I had seen them for the first time; but our common dangers, our hair-breadth escapes, their true services, made my friendship towards them feel as of older date; and it was with not a little regret that I bade them farewell!

It appeared by the list at the Priory, that mine was the sixteenth ascent, and later in the season by seven days than any former one. By the same document, I found myself to be the twentieth person (guides not included), and the twelfth Briton, who had reached the summit. A certificate, from the Sardinian Government, of having accomplished the ascent, was, as is usual, received from the Syndic, or Magistrate of Chamonix, attested by the guides.*

* Extract from the certificate:—

"Nous, Sindic de la Commune de Chamonix, province de Faucigny, Duché de Savoie, certifions et attestons à qui de droit, que

Of those who have reached the summit up to the present time, there appear to have been 1 Savoyard, 2 Swiss, 12 Britons, 1 Courlandais, 1 Hamburger, 1 Pole, 2 Americans—in all, 20.*

Monsieur *Martin Barry*, Anglais, Docteur en Medecine et en Philosophie, a fait l'ascension du Mont-Blanc, le dix-sept du Courant, accompagné des six guides de nommés Tairraz Jean Pierre, Couttet Joseph Marie, Balmat Jean Michel, Despland François, Tournier Simon, et Tairraz Jean. Qu'ils sont partis de Chamonix le seize du Courant pour aller coucher au *Grand Mulet*, et parvenus le lendemain dix-sept du Courant sur la *cime* du Mont-Blanc, à deux heures apres midi, avec un beau tems, où Mr le Docteur Barry est resté, accompagné de ses guides, plus d'une heure de tems, et où il a fait diverses expériences phisiques, et observations barométriques. Qu'il sont successivement redéscendus coucher au Grand Mulet, où ils sont arrivés à sept heures du soir, et de retour ici aujourdhui à Chamonix à trois heures apres-midi, tous sains et saufs: que pendant leur ascension, ils ont continuellement [frequemment] été aperçus et observés par la multitude des voyageurs qui se trouvaient à Chamonix, et par les habitants de la Commune, (même au moment où ils arrivèrent à la sommité de cette montagne dont l'élevation fait témérité(?) et la rend remarkable. * * * * * En témoignage de quoi nous lui avons délivré le présent, que nous avons signés, avec les six guides de Mr Barry."

CHAMONIX, *le* 18. 7 *bre*, 1834.

(Signed) *Couttet Joseph.*
Michel Balmat.
Jean Tairraz.
Simon Tournier.
Francois Despland.
Pierre Tairraz.

Le Sindic de Chamonix,
(Signed) COUTTET,
Sindic.

* Count de Tilly, a Frenchman, arrived at Chamonix three weeks afterwards. Hearing that we had found the ascent to be practicable, and that no countryman of his had ever been up the mountain, he determined to make the attempt, and succeeded. As he remained but a

On the day after my return from the mountain, I visited on foot *Montanvert* and the *Jardin*, returning to the Priory in the evening, a distance estimated at fourteen leagues (a tolerable proof of my not having suffered excessively from fatigue). The observations with the barometer and thermometer at these places, at Geneva, and the Hospice of the Great St. Bernard,* as well as those already mentioned, are given in the following table :—

			Eng. Inches.		
Mont Blanc.	Summit, Sept. 17, P.M. 2¾.	Barom.	17,052.	Therm. attached	32°.00 F.
....	Grand Mulet, ... 16, P.M. 6¾.	....	21,235.	....	45°.50 ..
	.... 17, P.M. 6½.	....	21,225.	....	44°.37 ..
	... 18, A.M. 6¼.	....	21,198.	....	39°.87 ..
Priory.	Chamonix, ... 18, P.M. 5. (After descent from M. Blanc)	....	26,918.	....	71°.37 ..
	Jardin, ... 19, P.M. 3.	....	22,034.	....	58°.44 ..
	Montanvert, ... 19, P.M. 8.	....	24,334.	....	61°.25 ..
Priory.	Chamonix, ... 19, P.M. 11. (After returning from Jardin)	....	26,973.	....	64°.62 ..
Great St. Bernard.	.... 17. A.M. 9.	....	22,717.	....	59°.45 ..
	.... 17, NOON.	....	22,717.	....	61°.25 ..
	.... 17, P.M. 3.	....	22.700.	....	61°.47 ..
Geneva.	.... 17, A.M. 9.	....	28,962.	....	72°.50 ..
	.... 17, NOON.	....	28,962.	....	78°.11 ..
	.... 17, P.M. 3.	....	28,930.	....	78°.11 ..

few minutes on the summit, it is probable the cold was very intense: and in descending his feet were frozen.

* The observations made at the Hospice of the Great St. Bernard, and at Geneva, on the 17th, have been politely furnished me by letter, by Professor Maurice, principal editor of the "Bibliothêque Universelle," Geneva. For the sake of uniformity, I have reduced the barometrical measurements from French pouces, lignes, and decimals, to English inches and decimals; and the thermometrical, from degrees of Reaumur, to those of Fahrenheit. Perhaps, however, Geneva is too distant a station, as long ago foreseen by Sir George Schuckburgh. It is a remarkable fact, that the *average* differences between the

The barometer employed for these observations was an excellent one by Gourdon, Geneva; and it appeared to be in good order. I had procured it on the spot, just before the ascent. Its graduation was according to the French scale, but the observations are here, for the reader's convenience, reduced to English inches. The instrument was suspended at a height to suit the eye, and shaded from the sun as already mentioned. It is to be regretted that the suddenness of my journey up the mountain, tempted

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mercurial column at the Hospice of the Great St. Bernard, and that at Geneva, are far from uniform from time to time, although these averages are deduced from observations of twelve months,—a period sufficiently long, one may suppose, to compensate the effect of any possible error. I am informed by a relative of mine, that the comparative heights of the mercury at these two stations, for ten years, as given in the Bibliothèque Universelle for 1833, tome 1. pp. 27 and 32, both having been by him reduced to the decimal fractions of a "ligne," appear to be as follow; their differences, it will be seen, inserted in the last column, are not a uniform quantity.

Year,	Geneva Pouce.	Ligne.	Great St. Bernard. Pouce.	Ligne.		Mean Annual Difference, Pouce.	Ligne.
1823	26	10.73	20	9.32	=	6	1.41
1824	26	10.98	20	9.54	=	6	1.44
1825	26	11.55	20	9.49	=	6	2.06
1826	26	9.93	20	9.79	=	6	0.14
1827	26	10.65	20	9.20	=	6	1.45
1828	26	11.10	20	9.74	=	6	1.36
1829	26	10.30	20	9.63	=	6	0.67
1830	26	10.91	20	10.59	=	6	0.32
1831	26	10-65	20	10.30	=	6	0.35
1832	26	11.48	20	11.07	=	6	0.41

as I was at its base, by the fineness of the season, precluded me from obtaining additional instruments, with which the data might have been completed, for repeating the calculations of preceding travellers, as to the height of Mont Blanc.

P. S. The Syndic of Chamonix has obligingly furnished me with a list of all those who have accomplished the ascent. I extract the following from his letter:—

"*Etat de toutes les ascensions qui ont eu lieu à la cime du Mont Blanc.*

Date des ascensions.		
1786, Août 8.	Jacques Balmat (Guide of Chamonix)	de Chamonix.
	Le Docteur Paccard	,,
1787, ,, 3.	H. B. De Saussure	de Genève.
,, ,, 9.	Le Colonel Beaufoy	Anglais.
1788, ,, 5.	— Woodley	,,
1802, ,, 10.	Baron Doorthesen	de Courlande.
	— Forueret	de Lausanne.
1812, Sept. 10.	— Rhodas (Rodatz ?)	de Hambourg.
1818, Août 4.	Le Comte de Matezesecki	Polonnais.
1819, Juin 19.	Le Docteur Rensselaer	Américain.
	— Howard	,,
,, Août 13.	Le Capitaine Undrell	Anglais.
1822, ,, 18.	Fred. Clissold	,,
1823, Sept. 4.	— Jackson	,,
1825, Août 26.	Le Docteur Edmund Clarke	,,
	Le Capitaine Markham Sherwill	,,
1827, Juill. 25.	Chas. Fellowes	,,
	W. Hawes	,,
,, Août 9.	J. Auldjo	Ecossais.
1830, ,, 3.	Le Capitaine Wilbraham	Anglais.
1834, Sept. 17.	Le Docteur Martin Barry	,,
,, Oct. 9.	Le Comte de Tilly	Français."

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